REMARKS/ARGUMENTS

Claims 1-26 are pending. Amendments have been made as suggested by the Examiner to correct the erroneous claim numbering in the claims as originally filed. Applicant appreciates the Examiner's suggestions in this regard.

Claims 3, 5-14, 18, 21, 23, and 26 were indicated to be drawn to patentable subject matter, but were objected to as being dependent on rejected claims. Claims 1, 2, 4, 15, 16, 17, 19, 20, 22, 24, and 25 were rejected as anticipated by U.S. Patent No. 5,440,879 to Dellora.

Applicant appreciates the indication of allowable subject matter. However, for the reasons set forth below, it is respectfully submitted that all of the pending claims are patentable over the cited reference.

The invention defined by independent Claims 1 and 17 relates to a control system and method, respectively, that address the objective of improving the speed of transient response of a turbocharger variable-geometry mechanism when operating conditions change. In accordance with the claimed invention, the control signal that is supplied to an actuator for the variable-geometry mechanism comprises either (1) a first value comprising a <u>pulse</u> of predetermined amplitude and duration, or (2) a second value different from the first value. The first value or pulse is supplied when the difference {desired control value – a previous desired control value} is greater than a predetermined threshold; otherwise the second value is supplied.

The idea behind the claimed invention is that when operating conditions change rapidly such that a calculated new position for the variable-geometry mechanism differs by a relatively large amount (i.e., greater than the predetermined threshold) from the previously calculated position in a previous control iteration, transient response of the turbocharger can be improved by supplying a large-amplitude pulse of relatively short duration to the actuator, after which the control signal is switched to a "normal" control signal (i.e., the "second value" as claimed).

As an illustrative example, the specification in Figure 8 and accompanying text describes a comparison between a conventional control method and a control method in accordance with the invention, for a full-range displacement (fully closed to fully open) of variable turbine nozzle vanes in a turbocharger system. The initial pulse of the control signal results in a considerably improved transient response of the vane displacement compared to the conventional approach without any such pulse.

Dellora does not remotely suggest a control system and method for improving transient response time of a variable-geometry mechanism of a turbocharger. Indeed, Dellora states that his object is to remedy the drawbacks of known systems that, in response to rapid variations of the input signals during engine transients (e.g., rapid accelerations), can cause an increase in turbocharger speed "which may easily revolve excessively." In other words, Dellora is concerned with avoiding overspeeding of a turbocharger.

To attempt to meet this objective, Dellora provides a control system and method that monitors the turbocharger speed **nT** and compares it to a predetermined maximum speed **Ntmax**. If **nT** is less than **nTmax**, then a switch **50** is positioned in a first position **46** so as to supply a control signal to the actuator **31** from a first calculation circuit **40**. If the speed **nT** is greater than **nTmax**, then the switch **50** is moved to the second position **47** so as to supply the control signal from a second calculation circuit **44**. See col. 2, lines 43-54

Nothing in Dellora teaches or suggests providing any control signal as a pulse of predetermined amplitude and duration as in the claimed invention. The Office Action in this regard points out Figure 2 of Dellora without further explanation. Applicant cannot find where Figure 2, or any other part of Dellora, shows or suggests any pulse control signal.

Additionally, Dellora does not make the decision to position the switch **50** (or any other switch) in the first or second position based on a difference between a desired control value and a previous desired control value, as claimed. As noted, Dellora makes the decision for switch **50** based on whether turbocharger speed is or is not greater than the maximum speed **nTmax**. There is another switch **57** that is part of the first calculation circuit **40**, but its position is not

determined based on the difference between a desired control value and a previous desired control value. Instead, switch **57** is positioned based on whether the first calculation circuit output signal **SBP** is larger or smaller than a stored limit value **Slim**, or on whether the signal **BPdiff** (the difference between an estimated supercharging pressure and an actual supercharging pressure measured by a sensor **29**) is larger or smaller than a stored limit value **BPdiff, max** (col. 3, lines 24-25, 48-50, 52-61).

For at least the above reasons, it is respectfully submitted that Dellora does not teach or suggest a control system and method as claimed in independent Claims 1 and 17. Independent Claim 16 is drawn to a control system having a logic circuit structured and arranged to produce a pulse control signal. As noted, Dellora does not suggest any such logic circuit. Claim 16 further recites means for providing a desired control signal to a first input of the logic circuit, and means for providing a previous control signal to a second input of the logic circuit. Nowhere does Dellora suggest any means for providing a previous control signal to a logic circuit.

Claim 16 also includes a controller structured and arranged to provide a normal control signal, and a switch receiving the normal control signal and the pulse control signal. The switch is responsive to the logic circuit output so as to provide the pulse control signal to the switch output responsive to a first value on the logic circuit output, and to provide the normal control signal to the switch output responsive to a second value on the logic circuit output. Whether the first value or the second value is on the logic circuit output depends on the value of the difference between the first and second inputs of the logic circuit (i.e., the difference between the desired control value and the previous control value).

Based on the previous explanation of Dellora, it should be apparent that Dellora does not teach or suggest a switch as required by Claim 16. As noted, neither the switch **50** nor the switch **57** in Dellora's system is controlled in any way based on a difference between a desired control value and a previous control value.

For these reasons, Claim 16 is respectfully submitted to be patentable over the cited reference.

With respect to the rejected dependent claims, other features are recited that are not suggested by Dellora. For instance, Claim 2 recites that the logic arrangement is structured and arranged to determine the amplitude and duration of the pulse as a function of said first difference parameter (i.e., the difference between the desired control value and the previous desired control value); Claim 19 is drawn to a corresponding method. Dellora does not teach or suggest such a logic arrangement or method, and hence Claims 2 and 19 are patentable for this added reason.
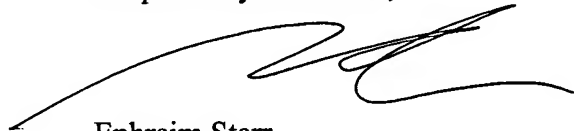
Claim 4 recites that the logic arrangement is structured and arranged to cause the control signal output to have the second value upon expiration of the duration of the pulse, and Claim 20 is directed to a corresponding method. Thus, simply as a function of time, the control signal output is changed. Nowhere does Dellora suggest changing a control signal as a function of time in any way, let alone changing the signal upon expiration of a pulse duration. Claims 4 and 20 thus are patentable for this added reason.

Claim 25 is drawn to a method wherein a previous desired control value is stored in a memory. Dellora never stores any previous desired control value in a memory.

Conclusion

Based on the above amendments and remarks, it is submitted that the application is in condition for allowance. The Examiner is invited to telephone the undersigned if there are any remaining issues requiring resolution before a Notice of Allowance can be issued.

Respectfully submitted,

Ephraim Starr
Registration No. 41,325

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Honeywell International, Inc.
23326 Hawthorne Blvd, Suite 200
Torrance, CA, 90505-3576
Tel.: (310) 791-9120
Fax: (310) 791-9125

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